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Рядовой Шутник

 [pfc_joker](#)<https://pfc-joker.livejournal.com/>[2013-06-26](#) 11:23:00

Technical characteristics of the RDS-1 object

As far as I can tell, this rather curious document has not been on the Internet until now (at least, search engines do not find it). Now it will be.

**Protocol for review of the main initial data for drawing up the technical characteristics of the
RDS-1 object ¹**

June 9, 1949 ²*Top Secret*

(Special Folder)

Accept the following initial data and provisions for drawing up the technical characteristics of the RDS-1 object.

- | | |
|-------------------------------------------------------------------------------------------|-----------------------------------------------|
| 1. Purpose | - special |
| 2. Application | - from the Tu-4 aircraft |
| 3. Overall length | – 3340 ⁻²⁰ mm ^a |
| 4. Maximum diameter | – 1500±1 mm |
| 5. Maximum tail span | – 2085 ⁻⁵ mm |
| 6. Distance from the head cut to the hanging eyes | – 1130±2 mm |
| 7. Weight | – 4600±100 kg |
| 8. Range of permissible drop heights that guarantee the product's operation | – from 5000 to 10000 meters |
| 9. Time of falling of the product from a height of 10,000 meters | – 54.8±2.0 s |
| 10. Characteristic time of fall ^b | – 21.4±0.25 s |
| 11. Drag coefficient | – 0.8 ^{+0.05} at M [from] 0.5 to 0.8 |
| 12. The final velocity of the product falling when dropped from a height of 10,000 meters | – 260±12 m/s |

13. Possible oscillation angles of the product axis relative to the tangent to the trajectory when dropped from a height of 10,000 meters – $10 \pm 5^\circ$
14. Explosion height - any, pre-set, within 200 to 600 m
15. Method for determining the height of the explosion - automatic, based on the measured distance to the ground by a radio altimeter or based on the measured static pressure by a barometric instrument. Both instruments are located in the product and operate in parallel and independently of each other
16. Accuracy of explosion height determination – via radio channel $\pm 20\%$ of the set altitude, via barochannel – depends on the accuracy of pressure prediction at the drop location. The maximum proper barochannel error without taking into account the prediction error is ± 200 m
17. Possibility of adjusting the set explosion altitude in flight – not corrected via radio channel, correction is allowed via barochannel
18. Method of explosion - automatic, using a special high-voltage system for initiating the explosive charge at 32 points
19. Detonator caps used - special spark detonator caps

20. Bringing the object into a state of readiness for explosion

- automatic, via two channels independent of each other:

- a) time, which includes the synchronous initiation system under high voltage after a certain time of fall, set from the aircraft;
- b) barometric, which includes the synchronous initiation system in parallel with the time channel when the product reaches a certain altitude

21. Aircraft product safety in flight

– in flight, the product has three levels of safety: the first is determined by the long-range arming system mentioned in paragraph 20; the second and third are determined by introducing two special switches into the electrical power supply circuit of the initiation system, the first of which is triggered at the moment the object separates from the aircraft, and the second – on the trajectory after a certain, pre-set (on the ground) time.

22. Power sources for automation and object initiation systems

- aviation batteries type 12A.10^c

23. Destruction of the product in case of failure of automatic detonation at a given altitude

– achieved by using a special contact detonating device with autonomous power sources that operates automatically upon encountering an obstacle³

24. Time for preliminary preparation of the product with an assembled composite explosive charge (filled with heavy fuel ^d) – 24 hours

25. Time required for final preparation of the object for dropping (including time for hanging the product on the aircraft ^e) – 4 hours

B. Vannikov
I.

Kurchatov Yu. Khariton

A. Alexandrov

P. Zernov

K. Shchelkin

N. Dukhov

V. Alferov

9.VI 49.

9.06.49.

Rosatom Archives. Fund 24, Document File 16344, Sheets 40–43. Manuscript. Original.

Quoted from: "The USSR Atomic Project: Documents and Materials", Volume 2, Book 6, pp. 590–592.

Notes (from the book, see footnotes):

1) Document title

2) Dated according to the date of signing the document by P.M. Zernov and V.I. Alferov

3) Then one word is written above the line

Well, here are a couple of my comments.

a) The order of writing the quantities and intervals in the document has been reproduced: $a \pm b$

on one line, a ^{+b} and a ^{-b} in superscript.

b) That is, the time of fall from a height of 2000 meters. In a free fall of a bomb in airless space, this value would be 20.193 s. As can be seen, despite the not very elegant "pot-bellied" shape of the RDS-1 body, air resistance increases the characteristic time by only a little over a second.

c) Two batteries - one for each automatic channel - were installed on the bomb's tail assembly ([see photo \(https://www.livejournal.com/away?to=http%3A%2F%2Fotki.yandex.ru%2Fusers%2Fpfc-joker%2Fview%2F596819%3Fpage%3D0\)](https://www.livejournal.com/away?to=http%3A%2F%2Fotki.yandex.ru%2Fusers%2Fpfc-joker%2Fview%2F596819%3Fpage%3D0)).

d) "Heavy fuel" is the conventional name for plutonium-239.

e) In addition to hanging on the aircraft, "final preparation of the object" probably included equipping the bomb with detonator caps.

TAGS: [RDS-1](#) , [aviation automation](#) , [history](#) , [nuclear weapons](#)



Increase in plutonium density due to implosion in RDS-1 and Mk.III Fat Man

Attentive readers of the "USSR Atomic Project" will probably remember that in one of the published documents the censor, for some

On the issue of the operational tension level of US nuclear forces

I don't know how new or widely known this information is, I'm writing this more for myself so I don't have to google the links again later. A little

North Korean thermonuclear

Here are some interesting photos from the North Korean

12 comments



[sirjones](#)

June 26 2013, 08:26:59 UTC

It seems that they were able to make the RDS-2 suitable for dropping from an airplane, and its copy, the RDS-3, was actually dropped.



[pfc_joker](#)

June 26 2013, 08:37:04 UTC

RDS-1 was never tested by air drop, but the results of its automatic "dry" tests (i.e. by dropping a bomb, the only difference from a combat one was that the plutonium core was replaced by a ball of inert material) were considered satisfactory enough to produce 29 serial bombs in 1949-1951.


The Americans, as is known, also did not test "Fat Man" by air drop - testing on a tower, testing the automatics by dropping unarmed bombs, and then immediately combat use.

And about RDS-2 and RDS-3 is written in great detail here:


<http://pn64.livejournal.com/10283.html>

<http://pn64.livejournal.com/10852.html>

<http://pn64.livejournal.com/16987.html>

 [sirjones](#)
June 26 2013, 08:38:54 UTC

Thanks for the clarification.

 [pn64](#)
June 26 2013, 08:40:18 UTC

> (i.e. dropping a bomb, the only difference from a combat one was that the plutonium core was replaced by a ball of inert material)

I want to correct.

Not a plutonium core.

The central metal unit was replaced by an aluminum ball.

 [pfc_joker](#)
June 26 2013, 08:48:13 UTC Edited: June 26 2013, 08:54:05 UTC

That is, instead of the entire assembly of tamper-reflector-plutonium core-neutron fuse, they inserted a solid aluminum ball? I wonder if the ballistic characteristics of the bomb did not change as a result (due to the change in mass)? However, probably not, it is unlikely that this unit was that heavy - for "Fat Man" they give an estimate of the mass of the reflector of 120 kg, and the tamper is already aluminum, so it will not contribute to the change in mass.

L

**pn64**June 26 2013, 08:56:20 UTC Edited: June 26 2013, 08:59:45 UTC

> So, instead of the entire tamper-reflector-plutonium core-neutron fuse assembly, they inserted a solid aluminum ball?

+ Boron filter.

I scratched my head and realized that I was hasty.

All the documents on this topic that I came across talk about replacing the CMU with aluminum. But this does not mean that the tests could not have been conducted in the configuration you are talking about.

> I wonder if the ballistic characteristics of the bomb did not change as a result (due to the change in mass)?

However, probably not, this unit was hardly that heavy - for "Fat Man" they give an estimate of the reflector mass of 120 kg, and the tamper is already aluminum, so it will not contribute to the change in mass.

Everything is correct. Compared to 4.6 tons - a small value.

L

**pn64**June 26 2013, 08:37:34 UTC

> It seems that they were able to make the RDS-2 suitable for dropping from an airplane, and its copy, the RDS-3, was actually dropped.

And was the RDS-1 made for the museum?


The RDS-3 is, yes, a copy of the RDS-2, only with a different nuclear charge.

**pn64**June 26 2013, 08:35:54 UTC

Thank you.

**militaryrussia**June 26 2013, 13:49:48 UTC

A huge one!

 **loki_trikster**
June 26 2013, 20:18:14 UTC

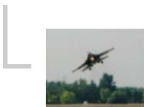
It's funny that modern products don't have any electronics or power sources.

 **pfc_joker**
June 26 2013, 20:30:42 UTC

there is no electronics

Is this some kind of joke? It's not funny.


Deleted comment


 **pfc_joker**
June 26 2013, 20:54:09 UTC


Where, when, under what circumstances? Photo in the studio.

Without any specifics, it is rather difficult to believe such bold statements. For example, how do you think the neutron initiation system functions if "there is no electronics"?

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Increase in plutonium density due to implosion in RDS-1 and Mk.III Fat Man

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ENGLISH

North Korean thermonuclear

Here are some interesting photos from the North Korean

https://pfc-joker.livejournal.com/48399.html

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